

Our great countryman, Mr. Wallace, who, we believe, met with this ground-cuckoo in Sarawak, also speaks of its terrestrial habits, and states that its mode of life resembles that of the pheasants of the genus *Euplocamus*. Little else appears to have been recorded respecting this cuckoo, which is certainly one of the most peculiar forms of bird-life that have of late years been exhibited in the Zoological Society's aviaries.

On examining the specimen in question, which, when it first arrived, had only a half-grown tail, but is now in excellent plumage, it will be at once observed that the naked space round the eye has been incorrectly coloured in Temminck's figure of this species. Instead of being of a red colour as there represented, it is of a nearly uniform pale green, as is likewise the bill. Few non-professional ornithologists, indeed, would recognise a cuckoo in the pheasant-like ground-loving bird with large bright bill, which is labelled in the Zoological Society's Gardens "The Radiated Ground-Cuckoo."

#### MR. STROH'S VIBRATORY EXPERIMENTS

A CENTRE of attraction at the recent Paris Electrical Exhibition was the Norwegian section, in which Prof. Bjerknes of Christiania exhibited his remarkable experiments with little drums or tambours vibrating under water, and attracting or repelling each other according as the phase of the pulsations was like or unlike. An account of his results was published in NATURE, vol. xxiv. p. 361, and the analogy between them and the well-known effects of magnetism was there drawn attention to. The field opened up by Prof. Bjerknes has been entered by Mr. Augustus Stroh, a well-known member of the Society of Telegraph Engineers and of Electricians, who recently delivered a lecture on his researches. Mr. Stroh has gone over the experiments of Dr. Bjerknes in air as a medium for propagating the pulsations of the drums instead of water, and has advanced beyond his predecessor in further experiments on the same line. The beauty of the apparatus and methods devised by him, and the exquisite skill with which he manipulated them, elicited the unanimous admiration of his hearers.

The drums employed by Mr. Stroh were small shells of wood having their mouths covered by an elastic membrane and their rears communicating with a flexible pipe, through which the pulsating air was communicated to the membrane, so that it could cause the latter to bulge out or collapse at every wave of air. The source of the vibrations was a vibrating reed, against which the air was forced by a small hand-bellows shaped like an accordion. By employing a flexible forked tube with arms of equal length, each fitted with a drum at the end, the vibratory air-blast from the reed could be conveyed to the drums so as to set them vibrating in like phase; and when one of the drums was mounted on a vertical axis, and free to rotate round it like the pole of a balanced magnetic needle, the approach of the other drum to it resulted in an attraction between them which was very pronounced. In this case the drums were vibrating in like phase, that is to say, they both bulged out and bulged in simultaneously. The mechanical explanation of the attraction is that there is a rarefaction of the air between the drums produced by the simultaneous advance and recession of the membranes toward each other. This rarefaction occasions a difference of pressure between the front and backs of the drums, causing them to move towards each other.

When, however, the vibrations are in opposite phase, that is to say, when one drum bulges out while the other bulges in, there is a repulsion between the drums corresponding to a condensation of air in the space between them. This condition of things is ingeniously obtained by means of an electromagnetic air-pump or bellows

devised by Mr. Stroh. It consists of an iron armature placed between the poles of two double electromagnets, and free to move alternately towards either electromagnet. This to-and-fro motion of the armature is kept up by making and breaking the battery circuit in the coils of the electromagnets alternately. The armature carries a cross-arm or lever-rod fixed at right angles to its axis, and the ends of the rod are attached to two leather diaphragms, which act as partitions across the interior of two boxes. Each of these two boxes communicates with the external air by two pipes or orifices, one on each side of the leather partition. Now when this diaphragm or partition stretching across the box oscillates, air is expelled from one compartment of the box, and at the same time air rushes into the other through the orifices provided. It follows that if the orifices communicate with two drums one drum will collapse whilst the other is inflated. Now the oscillations of the armature keep the diaphragm oscillating, and hence the two drums communicating with opposite compartments of the air-chamber are kept vibrating in unlike phase. By employing two such air-boxes or pumps Mr. Stroh is able at a moment's notice to change the vibrations of the two drums from like to opposite phase by simply connecting the drums to the two expelling compartments of the two boxes, or one to an expelling and the other to an in-drawing compartment of the box. The same device of a pivoted drum served in this case also to show that when the drums were vibrating in unlike phase there was repulsion between them.

In the science of magnetism we are taught that like poles repel and unlike poles attract; but in the experiments we are considering it is the drums in like phase which attract and those in unlike phase which repel. Mr. Stroh does not attempt to theorise upon his results; but if the analogy with magnetism hold good our ideas of what constitute like poles in a magnet will suffer a considerable change.

The aerial analogy for the attraction which always takes place between a piece of soft iron and a magnetic pole, whether it be a north or a south pole, was illustrated by Mr. Stroh in holding quiescent or non-vibrating bodies, such as his hand, or a piece of cardboard, near to either drum. The result was always an attraction of the drum towards the passive surface presented, whatever the phase of the drum. This attraction was prettily shown by means of a small round disk of paper attached to the end of a delicate lever pivoted on an upright stand like a magnetic needle.

The dying oscillations of the pole of a magnetic needle, when brought to rest in front of a disturbing magnet, were further illustrated by Mr. Stroh, in presenting the free drum a little apart from the pivoted one, and observing the latter shift round and oscillate before the other, until it came to rest face to face with it. This of course happened when the two drums were vibrating in like phase. When they vibrated in opposite phase, the pivoted drum moved away from the free one, and came to rest further off.

Until this point Mr. Stroh had been occupied with repeating Dr. Bjerknes' experiments in air; but beyond this he makes a new departure on his own account. The object of his further experiments was to ascertain what goes on in the air between the vibrating drums; and by inclosing a pair of the drums in an air chamber communicating with a capillary tube containing a column of spirits of wine to act on a pressure gauge he showed that when the vibrations were of like phase, the spirit fell, indicating that the air was expelled from between the drums, and on the contrary, when the vibrations were of unlike phase, the spirit rose in the tube, indicating that air had been drawn into the space between the drums, and the pressure thereby raised.

The most valuable part of Mr. Stroh's results was now

arrived at. By a series of test experiments he demonstrated that the lines of pressure in the air between the two drums are practically identical in direction with those which Faraday revealed to us in the magnetic field by means of iron filings. These were investigated by exploring the field between the drums with a small taper flame and noting the direction of the blast, as well as with a small windmill mounted on a stand, but the action of both these explorers requires a still atmosphere, and therefore could not be shown to a large audience. Mr. Stroh however, had devised a means of showing the movements of the air by models of the drums vibrating in glycerine traversed by the electric light which threw an image of the drums upon a screen. The membranes of the drums were oscillated in this case by working a crank and pulley, and four star-like water-wheels were pivoted between them in such a manner that when the drums were vibrated the wheels revolved under the streaming of the glycerine caused by the vibrations of the drums. Aniline blue placed in the glycerine at the middle of the surfaces of the drums also indicates the stream lines of the fluid to an audience. Starting from the middle, the glycerine separating into two trails, curved outwards into a kind of volute. This happened at both membranes, so that the space between was filled up by four such curves having a diamond space between them. This effect was produced by unlike phase, and closely resembled the arrangement of lines seen when two like magnetic poles are opposed to each other. On the other hand, the stream lines produced by vibrations in like phase were much less complex, and resembled the lines of force crossing over between two unlike magnetic poles.

#### NOTES

AT a meeting of the subscribers to the Memorial to the late Prof. Rolleston, held at the Royal College of Physicians on Thursday, June 1 last, it was resolved that the fund subscribed for the above object, which amounts to a little over 1100<sup>l</sup>, should be paid to the University of Oxford, as trustees, for the purpose of founding a prize, to be known as the Rolleston Prize, to be awarded every two years to the author of the best memoir embodying the results of original research on any branch of the following subjects:—Animal and Vegetable Morphology, Physiology and Pathology, and Anthropology. The prize, which will amount to about 70<sup>l</sup> on each occasion, is to be open to all members of the Universities of Oxford and Cambridge who have not exceeded in standing ten years from the date of their matriculation. The adoption of the report of the executive committee was moved by Prof. Acland. Sir James Paget, Mr. Douglas Galton, and other distinguished men of science were present. A vote of thanks to the chairman, Dr. A. B. Shepherd, who has been most active in the furtherance of the objects of the Memorial, and also to the secretaries, Messrs. W. M. Moullin, M.D., C. T. Acland, M.A., A. P. Thomas, M.A., and E. B. Poulton, M.A., was carried.

CAPT. DOUGLAS GALTON, R.E., C.B., F.R.S., has accepted the Presidency of the forthcoming Congress at Newcastle of the Sanitary Institute of Great Britain.

M. DUMAS, Perpetual Secretary of the Academy of Sciences, Paris, has, we understand, requested Dr. Siemens to allow a translation of his paper on the Conservation of Solar Energy to appear under M. Dumas' authority in the *Annales de Chimie et Physique*.

THE Committee for the arrangement of the Electric Exhibition in Vienna have resolved to delay the opening of the Exhibition till 1883.

THE fifth annual meeting of the Midland Union of Natural History Societies takes place at Nottingham on June 15. The

programme includes a *conversazione* on the 15th and various excursions on the 16th.

THE Jubilee Exhibition of the Royal Cornwall Polytechnic Society and the Fine and Industrial Arts, will be opened at the Polytechnic Hall, Falmouth, on Tuesday, September 5, 1882. The Exhibition will be on an extensive scale, and the Committee have determined to make it representative of the progress of the past half century in science and art, mining enterprise, naval architecture, and fishing, meteorology, photography, natural history, and statistics, as well as the fine arts pure and applied, more especially in connection with the county of Cornwall. The Exhibition will be attended by men eminent in science, who will come to Falmouth after the British Association Meeting at Southampton, several of whom will deliver lectures at the jubilee. Electricity and the electric light will be a special feature of the Exhibition. The Exhibition itself will occupy the Polytechnic Hall and the Volunteer Drill Hall, and will be open for double the ordinary period. Excursions on a large scale will also be organised for exploring the sea coast, the scientific and archaeological interests, and the natural beauties of the neighbourhood. In order to ensure success the Committee with confidence solicit the aid of all Cornishmen. They estimate that 600<sup>l</sup>. will be required to carry out the object in view.

A YOUNG Finnish lady, Miss Irene Åström, passed the examination for a candidate of philosophy at the University of Helsingfors, on May 24, with great honours. The young lady was subsequently, through a deputation of ladies, presented with a gold watch and chain, at a festive meeting given in her honour at the Ästhetic Club, Hesperia.

AT the expense of Herr Oscar Dickson, of Gothenburg, a promising young Swedish entomologist, Herr A. S. Mortenson, will, during the summer, study the entomology of the islands of Gotland and Öland in the Baltic.

IT ought to be mentioned, to the credit of our namesake, *Naturen*, that its recent numbers contain an unusually large proportion of original matter of more than local interest. To the April number, Hr. J. B. Barth, Director of Forests, has contributed an exhaustive and highly interesting memoir on forest economy generally, and on the biology of the Norwegian pine, *Abies excelsa*, specially. He treats at great length of the physical influence exerted by this tree, in rendering the earth around it more adaptable for its own rapid diffusion, as well as for that of other plants, and he regards it as of later development than the common fir, *Pinus sylvestris*, which, it appears, it is destined to some extent to supersede. The same number contains an amusing, but not uninteresting paper by Hr. Uhrbrand, on the appearance of will-o'-the-wisps (Norw. *Lygtemænd*) and their chemical or meteorological character, and a short notice by Hr. Reusch, of the conglomerates near Christiania. The May number gives a summary of Vogt's recent reports of the mines and minerals of Norway, from which it would appear, that while no sanguine hopes can be entertained of the continued yields of the once prolific Norwegian silver mines, the newly opened copper, nickel, and apatite works promise to become the most remunerative of the otherwise unimportant sources of national industry. The same number records the most interesting results of Hr. Tromholt's comparisons of the various meteorological observations made in Greenland, chiefly by officers of the Danish navy. From these it is shown, that while the auroral manifestations exhibit in Greenland the same periodicity of intensity as elsewhere, their minima and maxima do not correspond with those of the solar spots, the minima of the aurora coinciding with the maxima of the spots, and *vice versa*. It also appears, that the arch of the aurora is most frequently seen at the south of the magnetic pole, and only in exceptional cases in the north, and that mostly at the winter